WHAT IS CLAIMED IS:

1. A method for the production of totipotent tissue culture of a plant of the Class Monocotyledonae, the method comprising:

selecting an explant of living tissue from the plant.; and

cultivating the tissue on a primary medium to produce totipotent tissue.

2. The method according to claim 1, comprising, in addition:

cultivating the totipotent tissue on a secondary medium to produce complete plantlets having roots and shoots.

3. The method according to claim 2, wherein the explant of living tissue is cut into cross-sectional segments before cultivation on a primary medium.

4. The method according to claim 3, wherein the primary medium comprises a plant hormone and is capable of supporting the multiplication of the totipotent tissue.

5. The method according to claim 4, comprising, in addition:

cultivation on a tertiary medium which is free of added plant hormones and which supports shoot elongation.

6. The method according to claim 1, wherein the plant of the Class Monocotyledonae comprises a plant of selected from the group consisting of *Juncus spp., Scirpus spp., Cyperus spp., Carex spp., Erianthus spp., Typha spp, Cynodon dactylon, Digitaria sanguinalis, Erianthus giganteus, E. strictus, Miscanthus sinensis, Paspalum urvillei, Panicum dichotomum,*

Poa sp 1, Poa sp 2, Setaria gigantea, Sorghum halepense, Spartina alterniflora, S. cynosuroides, S. pectinata, S. spartinae, S. patens, Carex acuta, Carex sp 2, Cyperus esculentus, Cy. giganteus, Cy. haspan, Cy. iria, Cy. odoratus, Cy.pseudovegetus, Cy. retrorsa, Scirpus acutus, S. americanus, S. californicus, S. validus, Juncus articulatus, J. compressus, J. dichotomus, J. effusus, J. roemerianus, J. tenuis, Typha angustifolia, T.

dominguensis, and *T. latifolia.*

7. The method according to claim 3, wherein the explant comprises an inflorescence.

8. The method according to claim 7, wherein the inflorescence is from a pre-flowering shoot with leaf sheaths completely enclosing the developing but still unemerged immature inflorescence.

9. The method according to claim 2, wherein the primary medium and the secondary medium are solidified by the addition of a gelling agent that is selected from the group consisting of agar, agarose, Gellan gum, gelcarin, and mixtures thereof.

10. The method according to claim 1, wherein the primary medium is a mineral nutrient medium supplemented with plant hormones, vitamins and a carbohydrate or a mixture of carbohydrates.

11. The method according to claim 10, wherein sucrose is present in a concentration of about 30 g/l.

12. The method according to claim 6, wherein the secondary medium and the tertiary medium are supplemented with sucrose.

13. The method according to claim 12, wherein the sucrose is present in a concentration of about 30 g/l.

14. The method according to claim 10, wherein the plant hormone of the primary medium comprises an auxin and a cytokinin.

15. The method according to claim 14, wherein the auxin comprises 2,4-dichlorophenoxyacetic acid, picloram, and indolebutyric acid and the cytokinin comprises thidiazuron, zeatin, and dimethylallyladenine.

16. The method according to claim 2, wherein the plant hormone of the secondary medium comprises a cytokinin.

17. The method according to claim 16, wherein the cytokinin comprises thidiazuron.

18. The method according to claim 6, comprising the introduction

of a heterologous gene into the titopotent tissue.

19. The method according to claim 18, wherein the introduction of a heterologous gene is effected by cocultivation with *Agrobacterium tumefaciens* that results in the transfer of one or more genes from *A. tumefaciens* to the titopotent tissue.

20. The method according to claim 18, wherein the introduction of a heterologous gene is effected by DNA transfer.

21. A method for the micropropagation of a plant of the Class Monocotyledonae, the method comprising:

selecting an explant of living tissue from the plant.;

cultivating the tissue on a primary medium to produce a totipotent tissue culture;

cultivating the totipotent tissue on a secondary medium to produce complete plantlets having roots and shoots; and

acclimating the plantlets in soil.

22. The method according to claim 21, comprising the introduction of a heterologous gene into the totipotent tissue.

23. The method according to claim 22, wherein the plantlets are transgenic plantlets and the plantlets are used for phytoremediation or in phytoreactors.

24. Totipotent tissue of a Monocotyledonae plant that is produced by the method of claim 1.

25. Transgenic totipotent tissue of a Monocotyledonae plant that is produced by the method of claim 18.

26. A plant of the Class Monocotyledonae that is produced by the method of claim 21.

27. A transgenic plant of the Class Monocotyledonae that is produced by the method of claim 22.

28. A method for removal of an environmental pollutant from wastewater, the method comprising:

providing at least 10 plants from the Class Monocotyledonae that possess the same genetic characteristics;

establishing the plants in a liquid medium; and

contacting the roots of the plants in the liquid medium with an environmental pollutant,

thereby causing the environmental pollutant to be removed from the liquid medium.

29. The method according to claim 28, wherein at least 1000 plants from the Class Monocotyledonae that possess the same genetic characteristics are provided.

30. A method for bioremediation of an environmental pollutant from a land area, the method comprising:

providing at least 10 plants from the Class Monocotyledonae that possess the same genetic characteristics;

establishing the plants in soil;

and contacting the roots of the plants with the environmental pollutant in the land area,

thereby causing the environmental pollutant to be removed from the land area.

31. The method according to claim 30, wherein at least 1000 plants from the Class Monocotyledonae that possess the same genetic characteristics are provided.